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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/986,313	11/08/2001	Yukihiko Tanizawa	11-071	5198

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EXAMINER

DEB, ANJAN K

ART UNIT	PAPER NUMBER
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2858

DATE MAILED: 12/04/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>		<b>Applicant(s)</b>	
	09/986,313		TANIZAWA, YUKIHIKO	
	<b>Examiner</b>		<b>Art Unit</b>	
	Anjan K Deb		2858	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 08 November 2001.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-12 and 14-18 is/are rejected.
- 7) ☒ Claim(s) 1,3,13 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                  | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____  |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                         | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>4</u> . | 6) <input type="checkbox"/> Other: _____                                    |

## **DETAILED ACTION**

### ***Claim Objections***

1. Claims 1,3 are objected to because of the following informalities:

In claim 1 line 11, "temperature coefficient of resistor" should be --temperature coefficient of resistance--. Appropriate correction is required.

In claim 3, lines 3 and 5, the unit of impurity concentrations is incorrect. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 1 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites the limitation "said second temperature coefficient" in resistance (see lines 22-23). There is insufficient antecedent basis for this limitation in the claim.

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-5,8,11-12, 14-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sato et al. (US 4,233,848) in view of Sugiyama (US 4,576,052).

Re claim 1, Sato discloses (Fig. 2) a physical quantity (pressure) detection device comprising an operational amplifier (6), a first resistor (4) connected between an inverting input (d) and a first referential potential (a), a second resistor (31) connected between the inverting input (d) and a second referential potential (k), a reference voltage generator circuit ( $V_{cc}$ ,29,k,30) generating a reference voltage supplied to a non-inverting input of the operational amplifier (6), wherein the resistance (4) varies as a function of pressure with a temperature coefficient of sensitivity.

Sato did not expressly disclose a feedback resistor connected between input of operational amplifier (6).

Sugiyama discloses a feedback resistor  $R_f$  connected between input (28) and output (61) of operational amplifier for detecting pressure (Fig. 4).

At the time of the invention it would have been obvious for one of ordinary skill in the art to modify Sato by adding a feedback resistor disclosed by Sugiyama for temperature compensation of resistance of a pressure sensing resistor.

Re claims 2-3,17-18 Sugiyama discloses impurity concentrations in the range  $1.5 \times 10^{19}$  atoms/cm<sup>3</sup> and  $1.5 \times 10^{18}$  atoms/cm<sup>3</sup> respectively, considered equivalent.

*Optimization Within Prior Art Conditions or Through Routine Experimentation: MPEP**2144.05 Obviousness of Ranges.*

*Generally, differences in concentration or temperature will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration or temperature is critical. "[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955) (Claimed process which was performed at a temperature between 40°C and 80°C and an acid concentration between 25% and 70% was held to be prima facie obvious over a reference process which differed from the claims only in that the reference process was performed at a temperature of 100°C and an acid concentration of 10%). See also In re Hoeschele, 406 F.2d 1403, 160 USPQ 809 (CCPA 1969) (Claimed elastomeric polyurethanes which fell within the broad scope of the references were held to be unpatentable thereover because, among other reasons, there was no evidence of the criticality of the claimed ranges of molecular weight or molar proportions.). For more recent cases applying this principle, see Merck & Co. Inc. v. Biocraft Laboratories Inc., 874 F.2d 804, 10 USPQ2d 1843 (Fed. Cir.), cert. denied, 493 U.S. 975 (1989); In re Kulling, 897 F.2d 1147, 14 USPQ2d 1056 (Fed. Cir. 1990); and In re Geisler, 116 F.3d 1465, 43 USPQ2d 1362 (Fed. Cir. 1997).*

At the time of the invention it would have been obvious for one of ordinary skill in the art to modify Sato by including resistors having impurity concentrations in a suitable range as

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disclosed by Sugiyama so as to minimize the effect of temperature variations in the resistance of pressure sensing resistors.

Re claim 4, Sato et al. discloses that the resistance of first resistor 4 changes with pressure and the resistance of resistor 31 that does not change with pressure (Fig. 2).

Re claim 5, Sato et al. discloses reference voltage generator circuit (Vcc,29,k,30) generating circuit includes third (29) and fourth resistor (30) connected in series between reference potentials Vcc and ground. The temperature coefficient of resistance of resistors (29,30) is considered to be substantially equal as belonging to similar type of resistors.

Re claims 8, 11-12, Sato et al. discloses a third resistor (21), another operational amplifier (22) having inverted input supplied by the output of operational amplifier (6) through third resistor (21), and non-inverting input supplied by reference voltage (Vcc,26,27,28) and fourth resistor (25) disposed between an output terminal and inverted input of operational amplifier (22).

Re claim 14, Sato et al. disclose adjusting reference voltage by resistor (31) such that almost the same current flows through resistors 4,5 (Fig. 2).

Re claim 15, Sato discloses a physical quantity (pressure) detection device comprising an operational amplifier (6), a first resistor (4) connected between an inverting input (d) and a first referential potential (a), a second resistor (31) connected between the inverting input (d) and a

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second referential potential (k), a reference voltage generator circuit ( $V_{cc,29,k,30}$ ) generating a reference voltage supplied to a non-inverting input of the operational amplifier (6) wherein the reference voltage generator circuit includes third (29) and fourth resistor (30) connected in series between reference potentials  $V_{cc}$  and ground, and the resistance (4) varies as a function of pressure with a temperature coefficient of sensitivity.

Sato did not expressly disclose a feedback resistor connected between input of operational amplifier (6).

Sugiyama discloses a feedback resistor  $R_f$  connected between input (28) and output (61) of operational amplifier.

At the time of the invention it would have been obvious for one of ordinary skill in the art to modify Sato by adding a feedback resistor disclosed by Sugiyama for temperature compensation of resistance of a pressure sensing resistor.

Re claim 16, Sato discloses a physical quantity (pressure) detection device comprising an operational amplifier (6), a first resistor (4) connected between an inverting input (d) and a first referential potential (a), a second resistor (31) connected between the inverting input (d) and a second referential potential (k), wherein the first and second resistors have a temperature coefficient of resistance,

a reference voltage generator circuit ( $V_{cc,29,k,30}$ ) generating a reference voltage supplied to a non-inverting input of the operational amplifier (6) wherein the reference voltage generator circuit includes third (29) and fourth resistor (30) connected in series between

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reference potentials  $V_{cc}$  and ground, and the resistance (4) varies as a function of pressure with a temperature coefficient of sensitivity,

a third resistor (21), another operational amplifier (22) having inverted input supplied by the output of operational amplifier (6) through third resistor (21), and non-inverting input supplied by reference voltage ( $V_{cc}$ , 26, 27, 28), and fourth resistor (25) disposed between an output terminal and inverted input of operational amplifier (22).

Sato did not expressly disclose a feedback resistor connected between input of operational amplifier (6).

Sugiyama discloses a feedback resistor  $R_f$  connected between input (28) and output (61) of operational amplifier.

At the time of the invention it would have been obvious for one of ordinary skill in the art to modify Sato by adding a feedback resistor disclosed by Sugiyama for temperature compensation of resistance of a pressure sensing resistor.

4. Claim 6-7, 9-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sato et al. (US 4,233,848) and Sugiyama (US 4,576,052) in view of Kato (US 5,042,307)

Sato et al. as modified by Sugiyama did not expressly disclose trimming resistors.

Use of trimming resistors for calibration is well known in the art as disclosed by Kato wherein Kato (Fig. 1) discloses adjustable (trimming) resistors (22, 23, 26) are provided for zero point adjustment.



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At the time of the invention it would have been obvious for one of ordinary skill in the art to modify the combination system of Sato et al. as modified by Sugiyama et al. by adding trimming resistors disclosed by Kato for zero point adjustment.

***Allowable Subject Matter***

5. Claim 13 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

***Reasons for Allowance***

6. Claim 13 is allowable because the prior art does not teach or fairly suggest a sensing element and feedback element having temperature sensitivities represented by:

$$S(T)=S_0(1+\beta_1 \cdot T + \beta_2 \cdot T^2), R(T)=R_0(1+\alpha_1 \cdot T + \alpha_2 \cdot T^2), R_{Ts}(T)=R_{Ts0}(1+A_1 \cdot T + A_2 \cdot T^2)$$

respectively.

***Pertinent Art***

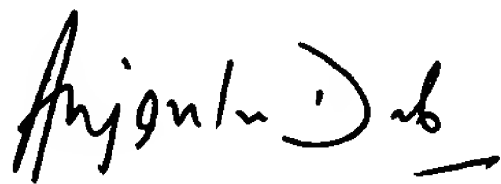
7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Cahill (US 4,890,497) discloses differential pressure sensor using Wheatstone bridge circuit 200 made up of four resistive elements, wherein the resistance of silicon sensors 180 and 190 vary as a function of pressure, and resistors 206 and 208 are fixed resistance (Fig. 10).

***Contact Information***

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dr. Anjan K. Deb whose telephone number is (703) 308-2941. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, N. Le, can be reached at (703)-308-0750.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone numbers are (703)-308-0956 and (703)-305-4900.



**Anjan K. Deb**

Patent Examiner

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12/3/02

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